NEW THERAPY FIELD DEVELOPED BY NAVY

Study of the 'Bends' Suggests Added Treatments for Heart Disease and Insanity

INSULIN SHOCK SIMULATED

Report on Oxygen-Nitrogen Diffusions Read at Medical Session by Lieut. Behnke

TO HEAD PHYSICIANS

Dr. James D. Bruce, the president-elect of the American College.

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CLEVELAND, April 1—Studies by the United States Navy Medical Corps on the effects of increased barometric pressure on the human system indicate that the administration of oxygen under pressure holds promise for the treatment of sinus infections, coronary heart disease and insanity. This was asserted here tonight before the annual meeting of the American College of Physicians by Lieutenant Albert R. Behnke of the United States Navy Medical Corps in a report outlining for the first time a new form of physical therapy to be known as oxygen pressure therapy.

The studies were made in the course of investigations by the navy into the nature of "bends," bugbear of deep-sea diving, and how to improve methods for its prevention. Bends is a condition developing from the formation of bubbles of nitrogen gas in the blood stream as a result of high pressure in the sea depths at which the diver works.

The navy physicians have been studying three different types of physiological effects of increased barometric pressure—the effects of pressure per se and the effects of gases diffusing into the body under pressure. The gases included the diffusion of nitrogen and of oxygen under pressure, the oxygen studies yielding the most promising effects.

Diffuses Into Tissues

The oxygen, Lieutenant Behnke reported, diffuses into the living tissues at pressure above normal.

"Inhalation of 99 per cent oxygen at atmospheric pressure," he said, "brings about a significant increase in the oxygen pressure in tissues to render this inhalation drug of prime importance in the treatment of coronary heart disease.

"The tolerance to 99 per cent oxygen inhaled by healthy men is about seven hours, but decreasing the oxygen percentage to 70 renders oxygen breathing safe for prolonged periods of time."

At a pressure of three atmospheres sufficient oxygen is taken up in physical solution so that the tissue requirements for oxygen are satisfied without the reduction of the oxygen content of the red blood cells (the vital oxygen-distributing agencies in the living body).

This, it was pointed out, may turn out to be a highly significant discovery in the treatment of heart disease and in other conditions where life is threatened by the failure of the mechanism that enables the red blood corpuscles to carry oxygen to the various tissues and organs in the body.

Until now only the red blood cells, through their red pigment (hemoglobin), could supply oxygen, the vital one-fifth component of the air we breathe; the navy studies reveal that through pressure it is possible to supply oxygen directly to the tissues in need of it without the intervention of blood corpuscles.

Shock Use Suggested

At a pressure of four atmospheres, the navy report continued, "oxygen induces convulsive seizures followed by apparent complete recovery."

"This fact," Lieutenant Behnke stated, "suggests the possibility of utilizing oxygen in shock therapy applicable in treating certain types of schizophrenia."

Schizophrenia, otherwise known as dementia praecox, is one of the most prevalent and serious forms of insanity. The only known treatment for it is insulin shock therapy, discovered within recent years by Professor Manfred Sakel of New York City. The effect of the treatment is believed to be due not to the insulin as such but to the shock produced by a measured overdose of it, which suddenly reduces the sugar content of the blood below normal.

Since it is the shock that produces the result, it is hoped that the shock produced by oxygen under pressure will prove as effective as the insulin, while at the same time not requiring the expert skill essential in the insulin shock thereapy.

The studies on the diffusion of nitrogen under pressure, Lieutenant Behnke reported, also brought interesting new data.

Increased barometric pressure, he declared, causes the nitrogen to be absorbed by the fluid and fat components of tissues in proportion to its partial pressure in the lungs. From nine to twelve hours is required for the reestablishment of gaseous equilibrium.

'Measurements of nitrogen eliminated from the body when oxygen is breathed," he reported, "enable us to approximate the fat content of the body. Moreover, the ability to eliminate excess nitrogen absorbed under pressure without subsequent bubble formation in the blood stream forms an exacting test of physical fitness.

Comparable to Alcohol Effects

"Atmospheric nitrogen absorbed by divers and caisson workers is not without physiologic effect and induces a narcosis characterized by impairment of neuro-muscular coordination comparable to the effects produced by alcohol. The substitution of helium for atmospheric nitrogen minimizes or abolishes these abnormal reactions."

Pressure per se, up to fifteen atmospheres, it was found, apparently has no effect on divers, provided that such pressure is equalized.

Pressures not equalized, Lieutenant Behnke reported, elicits the symptom of pain and produces congestion, swelling and hemorrhage. The most important factor preventing accommodation to increased pressure is occlusion (blocking) of the auditory tubes and the paranasal sinus passages induced by acute or chronic infection of the upper respiratory tract.

Possible New Fields Listed

"Inhaled carbon dioxide intensifies the narcotic property of nitrogen as well as the toxic effects of oxygen at high pressures," Lieutenant Behnke said. "The increase in cerebral circulation accompanying carbon dioxide inhalation explains this phenomenon in part and points to the value as well as the inherent danger incident to carbon dioxide therapy."

The navy high pressure studies, according to Lieutenant Behnke, point to five possible new fields of clinical application:

1. Employment of the pressure chamber for the diagnosis of obstruction in auditory tubes and sinus passages, and for the ventilation and drainage of sinus and pulmonary air spaces.
2. Approximation of the fat content of the body by measurement of the quantity of nitrogen diffusing out of the body when oxygen is breathed.
3. Test for physical fitness of healthy men involving the ability to eliminate rapidly excess gas absorbed into the tissues under pressure.
4. Wider utilization of oxygen inhalation therapy to increase tissue oxygen pressures as in the treatment of coronary heart disease, and,
5. Clinical tests to determine the value of oxygen inhaled at pressures in excess of one atmosphere.

Lieutenant Behnke presented his report at a symposium tonight on "Military Medicine."

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